
Active and Passive Voice Quality Testing

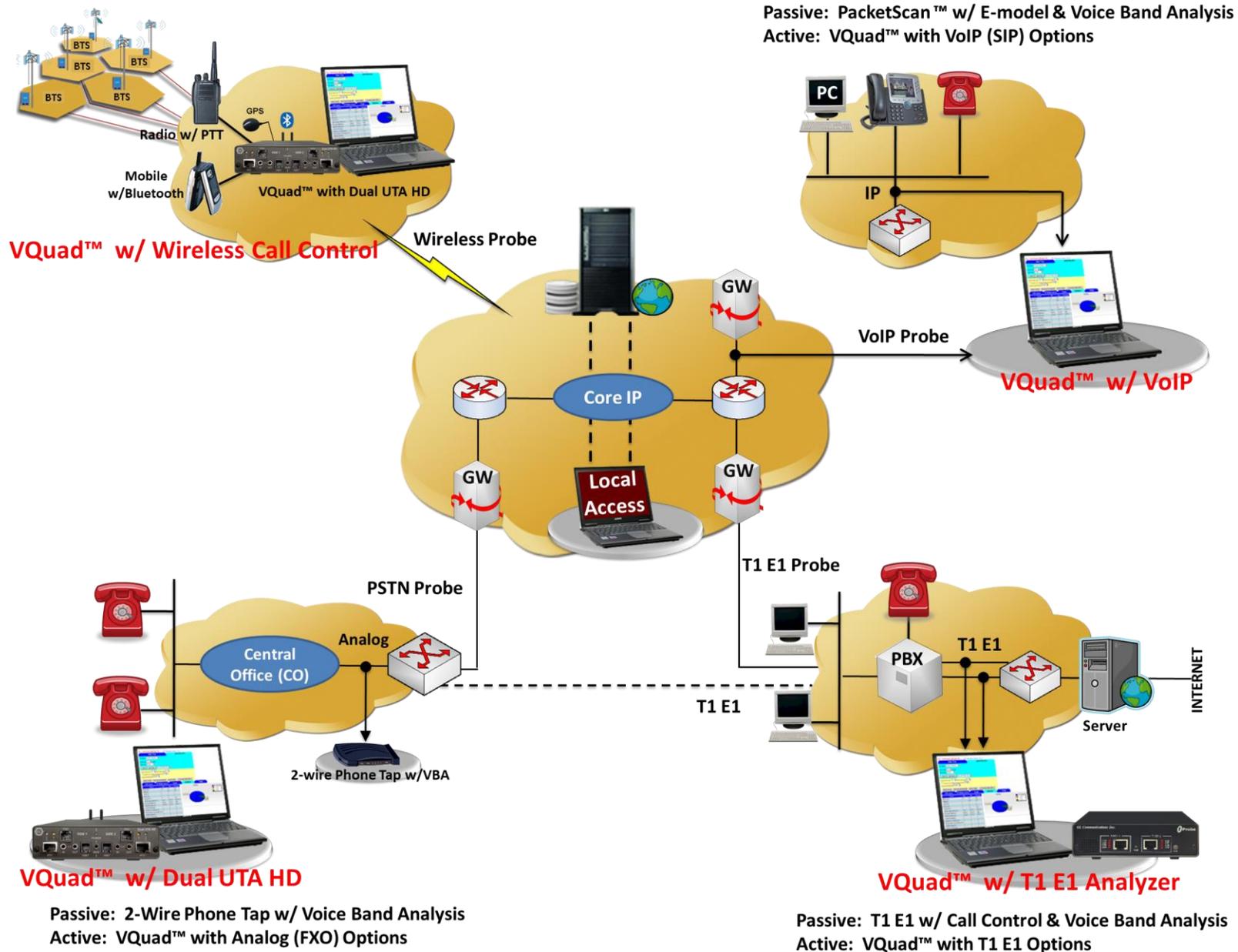


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Index

- Active and Passive VQT Network
- Call Simulation Tools
- TDM Call Simulation
 - T1E1 Cards / Units with CAS, ISDN, SS7
- MAPS Central Office Switching Simulation
- VoIP Call Simulation
 - MAPS™
- Active Voice Quality Monitoring System with VQuad™
 - VQuad™ Highlights
 - VQT Application
 - VQT goes Mobile (Drive Testing)
 - VQT WebViewer™
- Passive / Non-Intrusive Packet Monitoring and Surveillance System (VoIP)
 - NetSurveyorWeb™ & PacketScan™
 - Voice Band Analyzer (VBA) & VBA WebViewer™
- Passive / Non-Intrusive Network Monitoring System (TDM, Wireless)
 - T1 / E1 / IP
 - Call Capture Analysis (CCA)
 - Call Data Records (CDR)
 - Application Summary

Active and Passive VQT Network



Active and Passive VQT Network (Contd.)

Active QoS Analysis

- MOS score using ITU Standard Algorithms POLQA NB/WB/SWB and PESQ LQ/LQO/WB
- Additional Metrics include Jitter, Clipping, Levels, Latency
- Automated operation
- Results saved to database with full featured Query functionality
- Graphical and Tabular results can be exported to file

Passive QoS Analysis

- Call Quality Of Service (QOS) for all calls with E-Model based (G.107) Mean Opinion Score (MOS) and R-factor with individual and summary statistics presented in graphical and tabular formats
- MOS score for VoIP Networks using E-Model
- Near Real-Time QoS Measurements of All Networks
- Line Echo and Acoustic Echo Measurements
- Automated operation
- Results can be exported to file

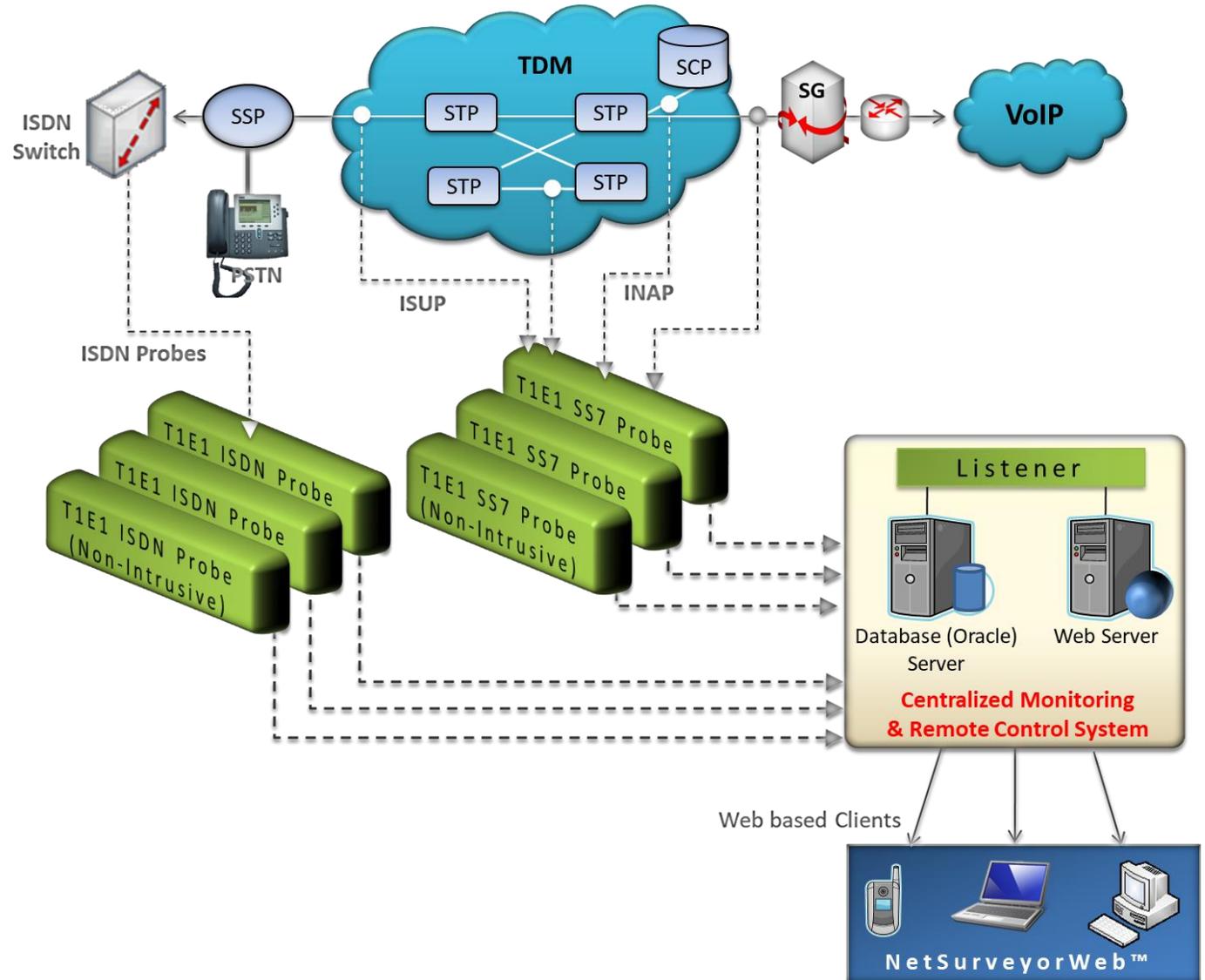
Active/Intrusive Network Monitoring System

Call Simulation Tools

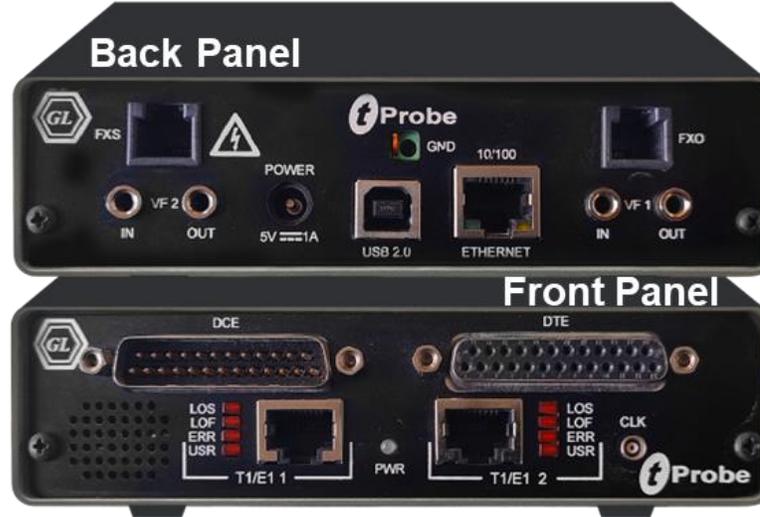
- Wireless Call Automation
 - Call Automation (automated call control of Wireless / WiFi phones)
- Products Applicable
 - VQuad™, MAPS-GSM A, GSM Abis, TRAU, LTE
- VoIP Call Simulation and Automation
 - Soft Phone Simulation (SIP, RTP, MGCP, MEGACO, SIGTRAN, and H.323 supported)
- Products Applicable
 - MAPS-SIP, MGCP, MEGACO, SIGTRAN
 - VQuad™
- TDM Call Simulation and Automation
 - T1/E1 Call Simulation (CAS, PRI ISDN and SS7 supported)
 - Analog 2-wire Phone Simulation (FXO)
- Products Applicable
 - T1/E1 Analysis Cards with CAS simulator, MAPS-ISDN, ISDN Emulator, & MAPS-SS7
 - MAPS™ Central Office Switching Simulation (MAPS™ CO)– CAS, SS7, ISDN
 - MAPS™ CO Analog Phone Simulator (APS)
 - MAPS™ CO Phone Simulator (BPS)
 - VQuad™

TDM Call Simulation

- T1 E1 Analysis Cards with CAS simulator, MAPS-ISDN, ISDN Emulator, and MAPS-SS7
- MAPS™ Central Office Switching Simulation (MAPS™ CO) – CAS, SS7, PRI ISDN
- MAPS™ Analog Phone Simulator (APS)
- VQuad™



T1 E1 Cards/Units with CAS, ISDN, SS7 Simulation



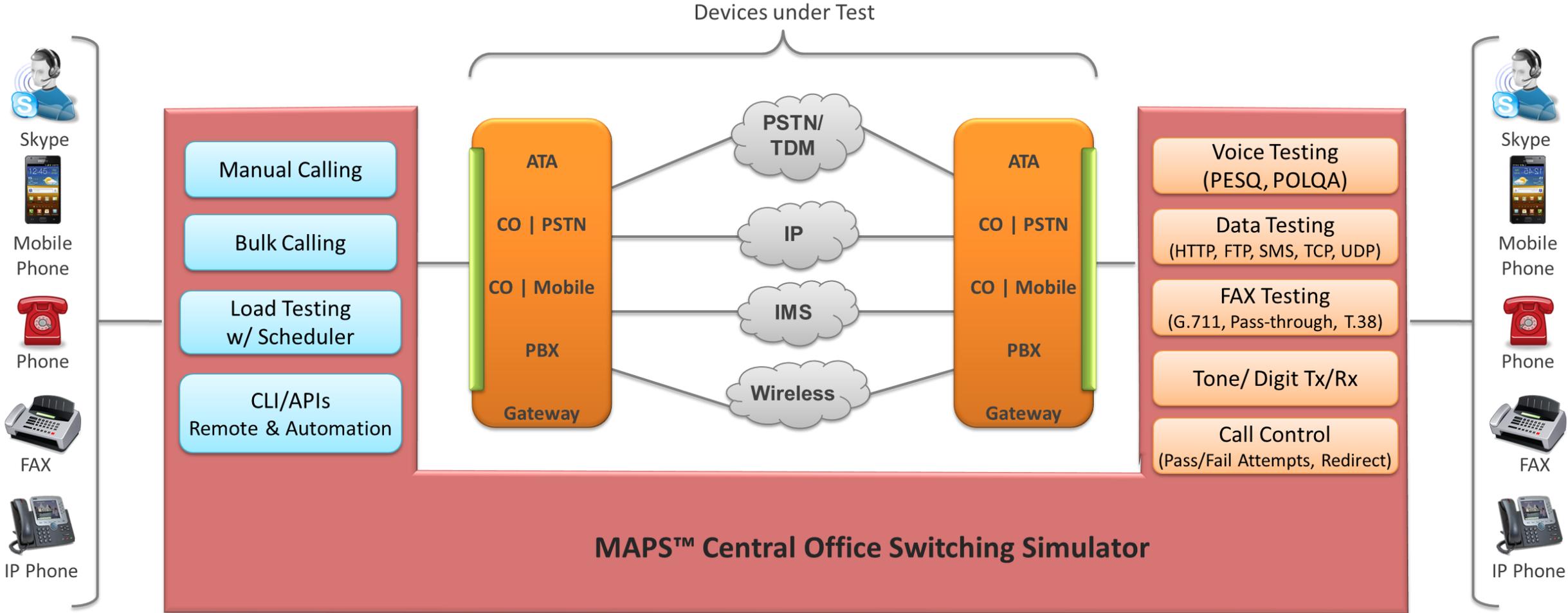
tProbe™ T1 E1 Analyzer



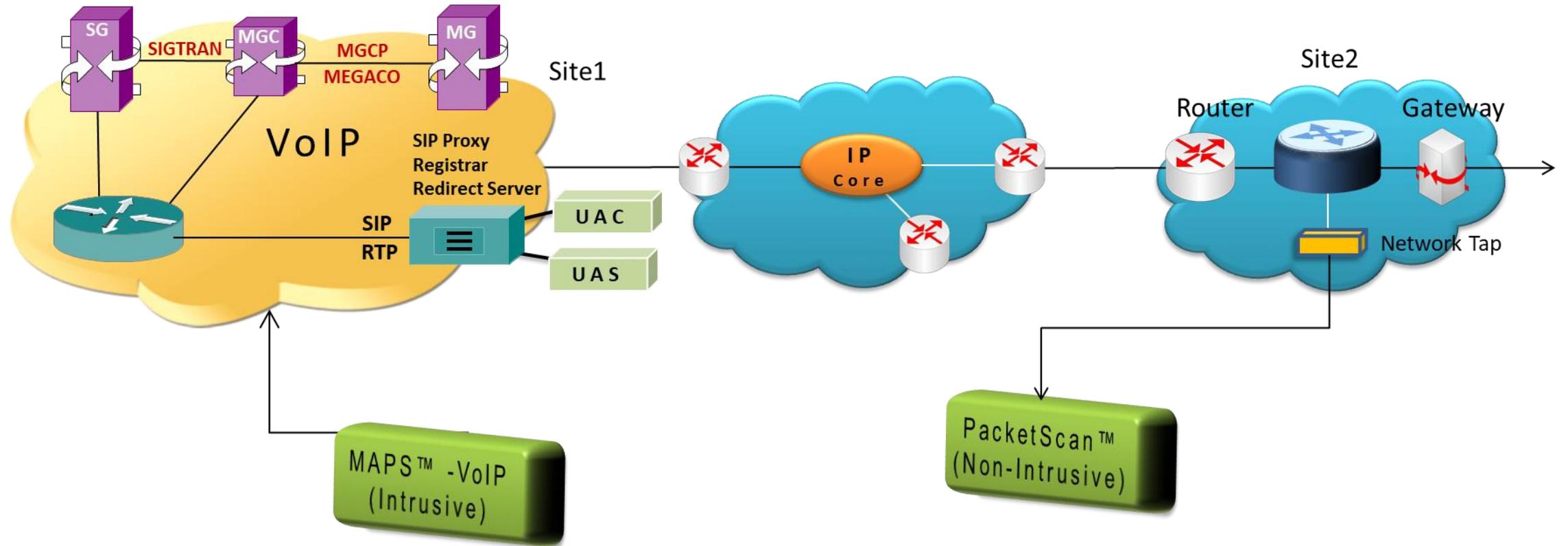
Dual T1 E1 Express (PCIe) Board

- TDM Call Simulation
 - Used for installation, test, and troubleshooting of T1 E1 lines
 - Capability of T1 or E1 PCM signal visualization, capture, storage, analysis, and emulation
 - Includes BERT, voice band analysis, data, signaling, and protocol analyzer all in one
 - Perform analysis and emulation of various signal types including voice, digits, and tones;
 - Simulation of various protocols including ISDN, SS7, CAS, and many more

MAPS™ Central Office Switching Simulation



VoIP Call Emulation



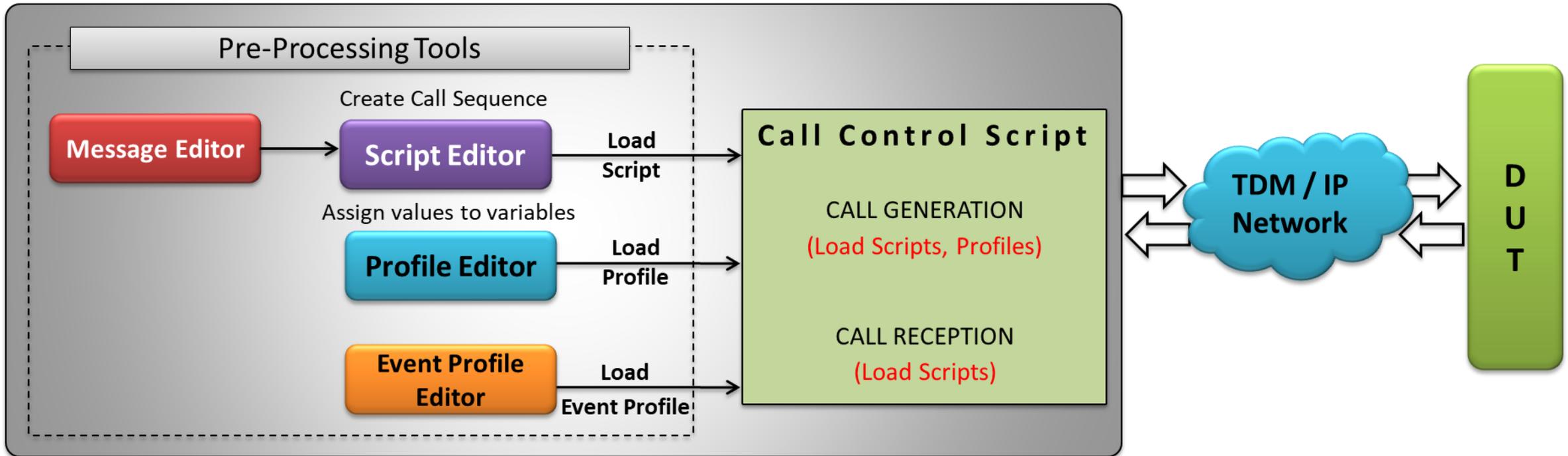
MAPS™ - An Overview

- VoIP call emulation
- Protocol emulation and conformance test tool
- Complete analysis and emulation capability on par with any protocol tester in the market
- Supports variety of protocols such as MGCP, SIP, MEGACO, SS7, ISDN, GSM, and others
- Includes various test plans and test cases to support the testing of a real-time scenario
- MAPS™ MAP Emulator supports powerful utilities like Message Editor, Script Editor, and Profile Editor which allow new scenarios to be created or existing scenarios to be modified using MTP3 layer (over TDM) and M3UA, M2PA layers (over IP) messages and parameters. Provides fault insertion, and erroneous call flows testing capability
- Functional testing and conformance testing of network elements
- Ready scripts makes testing procedure simpler, less time consuming and hence time to market products

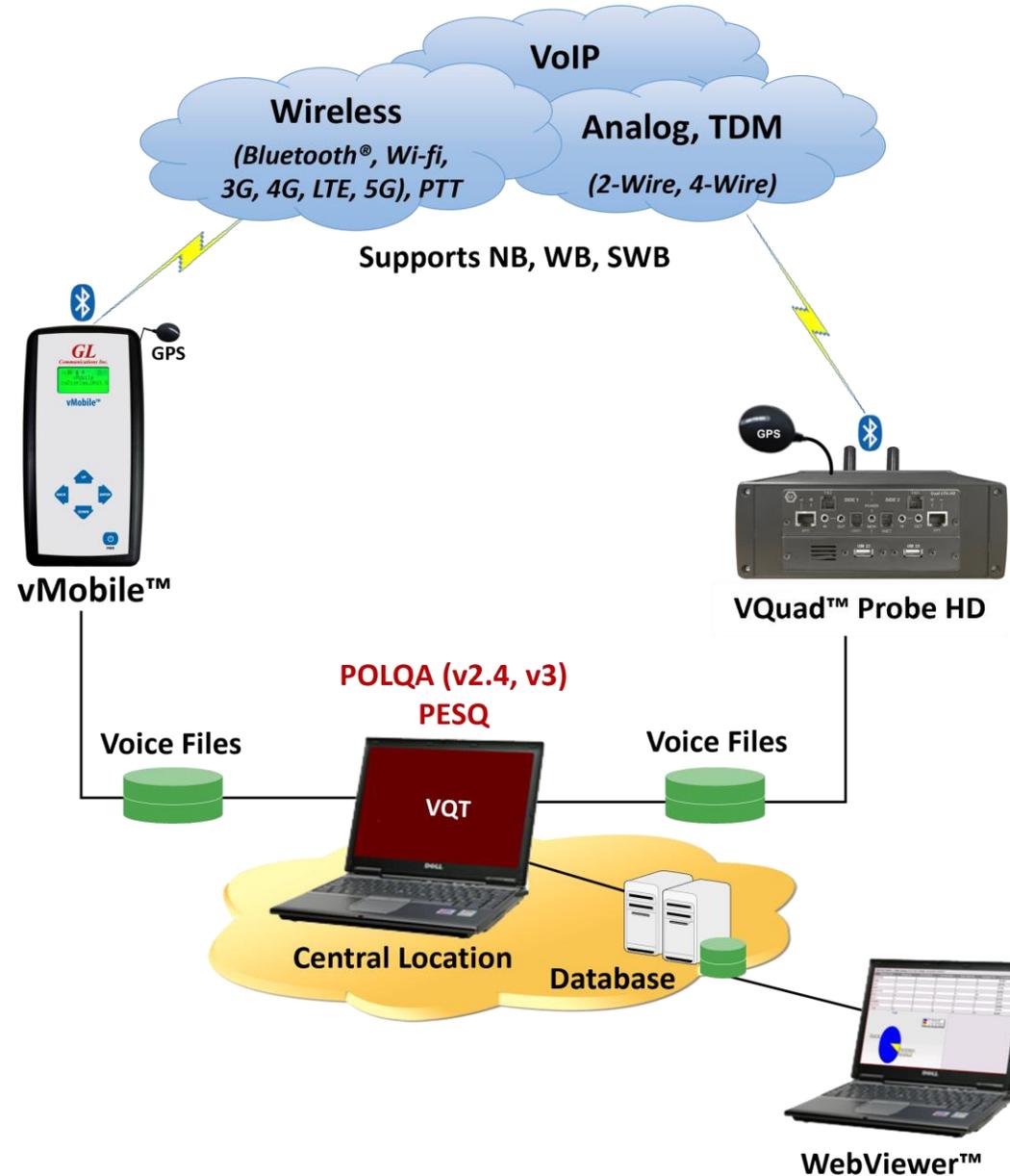
MAPS™ Working Principle

VoIP Call Emulation

Message Automation and Protocol Simulation (MAPS™)



Active Voice Quality Monitoring System with VQuad™/vMobile™

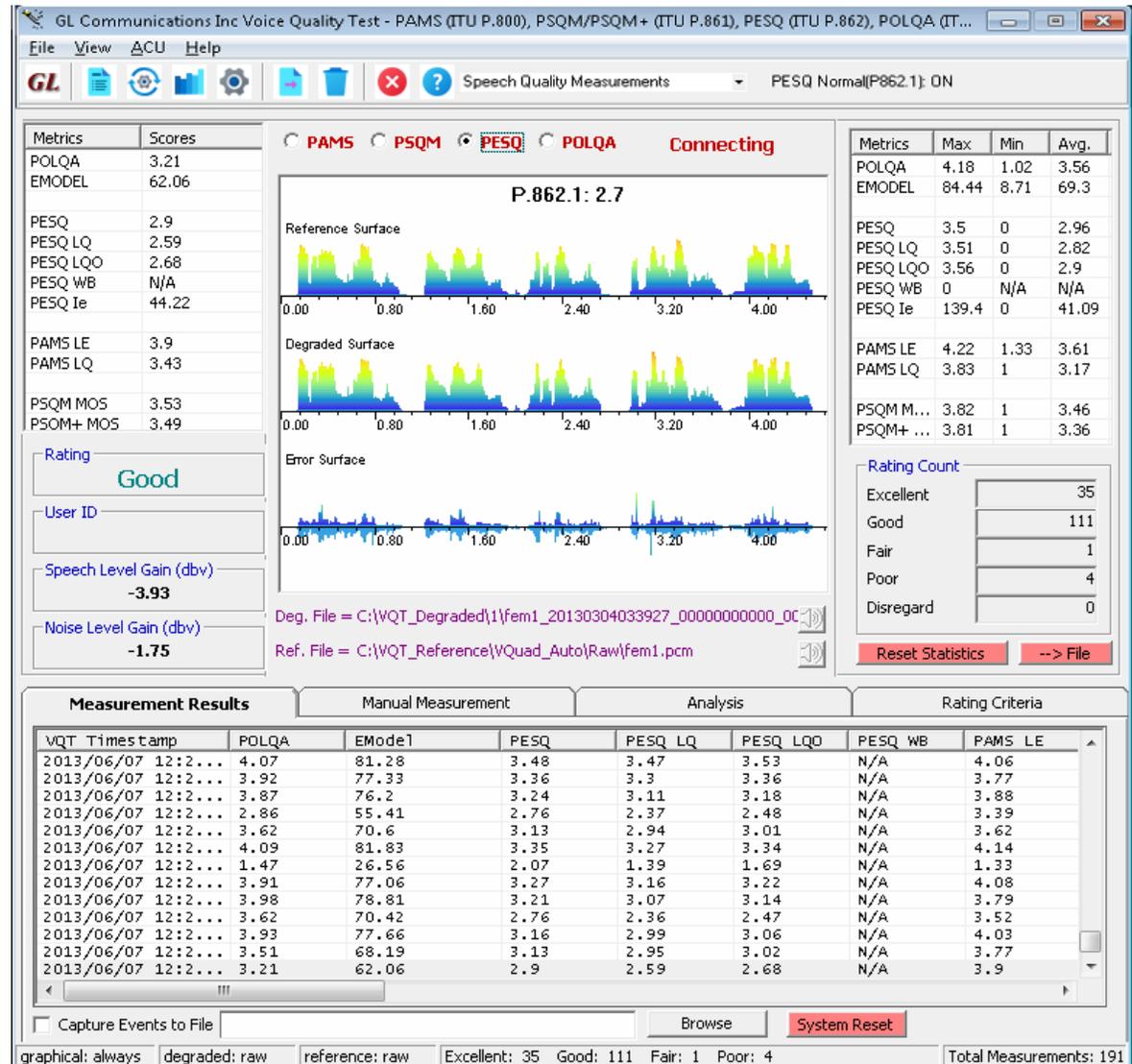


VQuad™ Highlights

- Up to 12 simultaneous devices (including two Dual UTAs)
- Automated call control & traffic scripting
- Voice Band Analysis for all interfaces
- DTMF / MF and Frequency Tone Transmit / Detect
- Round Trip Delay, One Way Delay, Echo Measurements
- Drive Testing with GPS Mapping (most countries supported)
- Indoor Track System (ITS) allows to test the VQT in remote and unreachable GPS signal places (ex: underground)
- Remotely Accessible

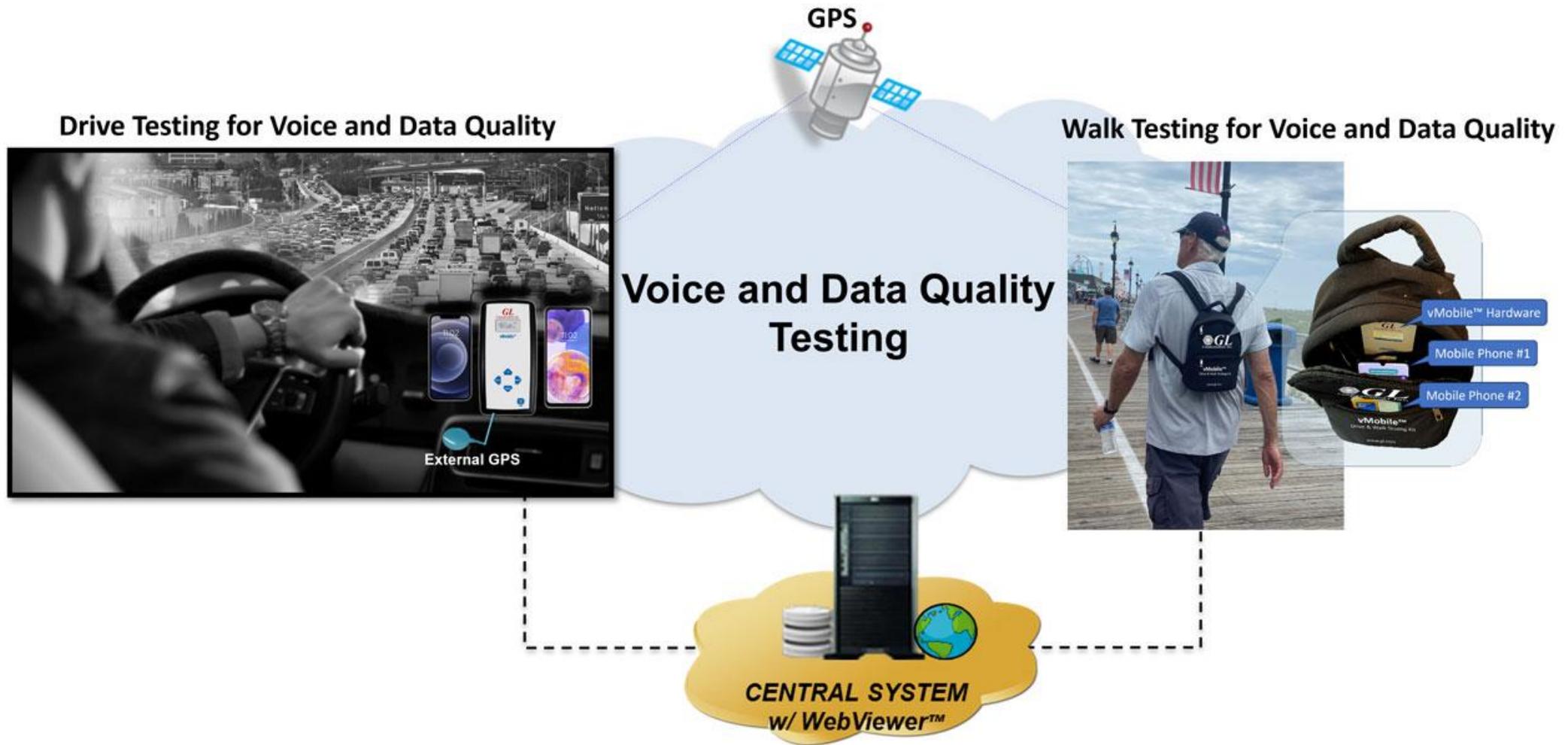
VQT Application

- ITU P.862.1 (PESQ)
- Auto-Measurement
- Detailed Results
- Criteria Rating
- Remote Access
- Round Trip Delay
- Jitter, Clipping, Levels



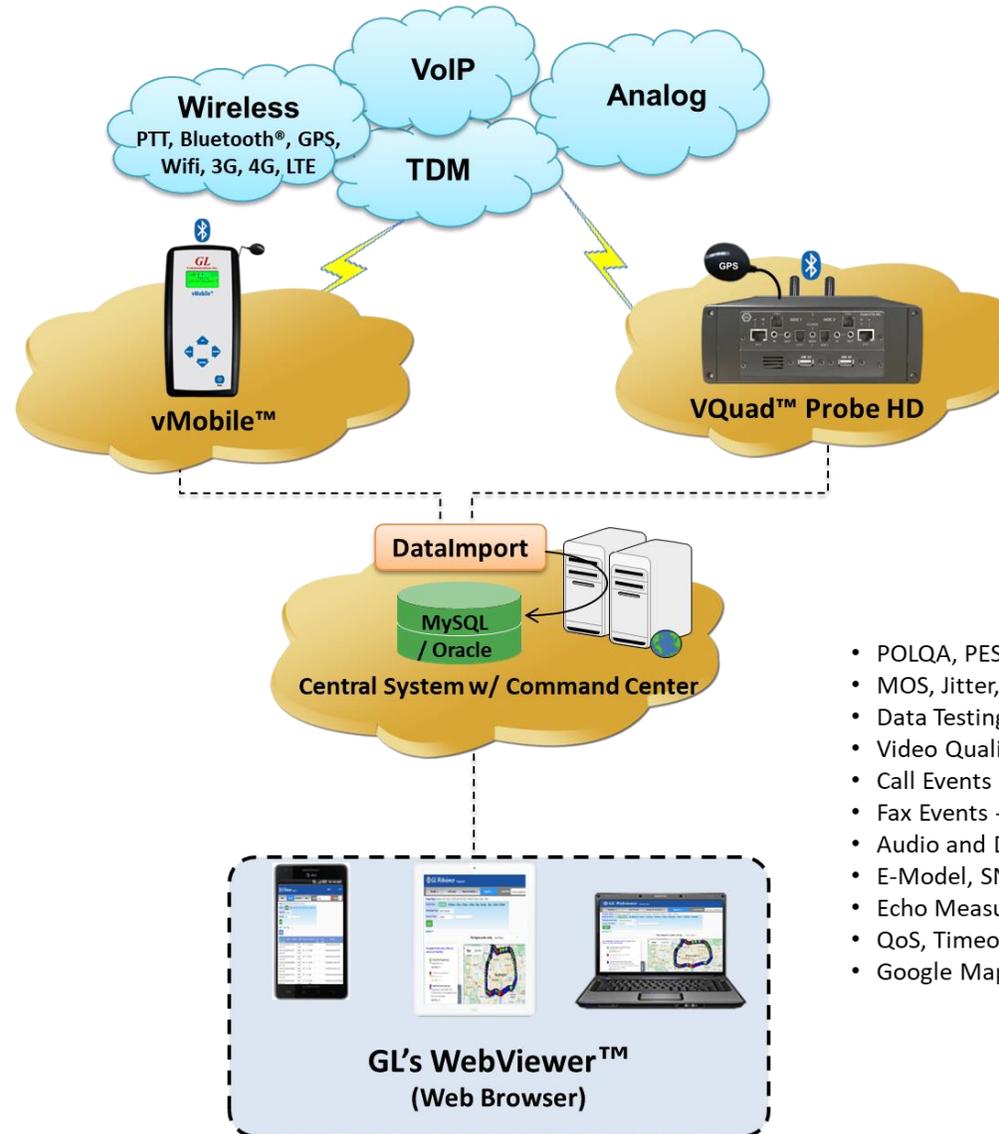
Drive and Walk Testing

Active Voice Quality Monitoring System



WebViewer™

- Accessible remotely via browser-based clients
- Multi-user support, and user-friendly interface
- Database stores the real-time and historic data collected
- Provides database query methods in order to query VQT results, and gather status, statistics, events
- Results are displayed both in tabular and graphical formats
- Customized statistics
- Remote Access of all Network applications
- Web Based browser accessing central database (Oracle or MySQL)
- All results/measurements/events from VQuad™, VQT, VBA automatically sent to central database via TCP/IP



- POLQA, PESQ LQ/LQO/WB
- MOS, Jitter, Clipping, Speech and Noise Levels
- Data Testing - Wired and Wireless Networks
- Video Quality Test Results
- Call Events - Progress & Failures
- Fax Events - Encoding, Resolution, ECM
- Audio and Delay Analysis
- E-Model, SNR, Signal Level
- Echo Measurements - ERL, Delay
- QoS, Timeouts, Retransmissions
- Google Mapping

WebViewer™ Features

- Accessible remotely via browser-based clients
- Multi-user support, and user-friendly interface
- Database stores the real-time and historic data collected
- Provides database query methods to query VQT results, and gather status, statistics, events
- Results are displayed both in tabular and graphical formats
- Customized statistics
- Remote Access of all Network applications
- Web Based browser accessing central database (Oracle or MySQL)
- All results/measurements/events from VQuad™, VQT, VBA automatically sent to central database via TCP/IP

WebViewer™ Records

| GL Webviewer | | | | | | | | | | | | | | | | | | |
|--|---------------------|--|-----------------|-----------------------|----------|-----------|-------------------|-----------|------|-----|---------------------------------|----------|---------|-----------|--------------------------|----------------------|----------------------|---------------------|
| Results ▾ | | Call Events | | Status & Statistics ▾ | | | | Reports ▾ | | | Load Filters: --Select Filter-- | | | | | | | |
| VQT-PESQ Results between 11/09/2022 05:21:05 and 05/09/2023 05:21:05 (Last 6 Months) | | | | | | | | | | | | | | | | | | |
| Date & Time | | Standard 10 Minutes 1 Hour 12 Hours 24 Hours Today Yesterday 7 Days 1 Month 6 Months | | | | | | | | | | | | | | | | |
| Timestamp Type | | VQuad / vMobile Timestamp ▾ | | | | | | | | | | | | | | | | |
| Event ID Filter | | Contains ▾ <input type="text"/> | | | | | | | | | | | | | | | | |
| Apply | | | | | | | | | | | | | | | | | | |
| Actions ▾ | | Records Per Page: 200 ▾ | | | | | | | | | | | | | | | | |
| VQuad Timestamp | Call Timestamp | VQuad Call ID | VQuad Device ID | VQuad GPS | Latitude | Longitude | Degraded Filename | Rating | PESQ | DAQ | PESQ LQ | PESQ LQO | PESQ WB | PSQM PLUS | PESQ Average Offset (ms) | PESQ Max Offset (ms) | PESQ Min Offset (ms) | Number All Clipping |
| 03/27/2022 15:34:34 | 03/27/2022 15:26:14 | GLRobFaxVQTTest | RobFXO2 | | 39.14 | -77.22 | fem1 | | 3.71 | 5 | 3.79 | 3.83 | | 0 | 661.45 | 661.5 | 661.38 | 0 |
| 03/27/2022 15:34:23 | 03/27/2022 15:26:14 | GLRobFaxVQTTest | RobFXO1 | | 39.14 | -77.22 | fem1 | | 3.34 | 4.7 | 3.26 | 3.33 | | 0 | 618.52 | 618.62 | 618.5 | 0 |
| 03/27/2022 15:34:11 | 03/27/2022 15:26:14 | GLRobFaxVQTTest | RobFXO2 | | 39.14 | -77.22 | fem1 | | 3.37 | 4.7 | 3.31 | 3.37 | | 0 | 648.1 | 648.12 | 648 | 0 |
| 03/27/2022 15:34:00 | 03/27/2022 15:26:14 | GLRobFaxVQTTest | RobFXO1 | | 39.14 | -77.22 | fem1 | | 3.37 | 4.7 | 3.32 | 3.38 | | 0 | 625.02 | 625.12 | 625 | 0 |
| 03/27/2022 15:33:49 | 03/27/2022 15:26:14 | GLRobFaxVQTTest | RobFXO2 | | 39.14 | -77.22 | fem1 | | 3.38 | 4.7 | 3.32 | 3.38 | | 0 | 648.85 | 648.88 | 648.75 | 0 |
| 03/27/2022 15:33:38 | 03/27/2022 15:26:14 | GLRobFaxVQTTest | RobFXO1 | | 39.14 | -77.22 | fem1 | | 3.39 | 4.8 | 3.35 | 3.4 | | 0 | 606.4 | 606.5 | 606.38 | 0 |
| 03/27/2022 15:33:26 | 03/27/2022 15:26:14 | GLRobFaxVQTTest | RobFXO2 | | 39.14 | -77.22 | fem1 | | 3.37 | 4.7 | 3.31 | 3.37 | | 0 | 743.5 | 743.62 | 743.38 | 0 |

Google Map Plotting

Display Options

Use Predefined Config ON OFF

Define results to display

vMobile_DriveTest_Oct2722

Draw route line by Default

ON

Draw line as

Direct Path

Refine your search

Types

- Threshold Settings
- VQuad Call ID
- VQuad Device ID
- Call Events

Results

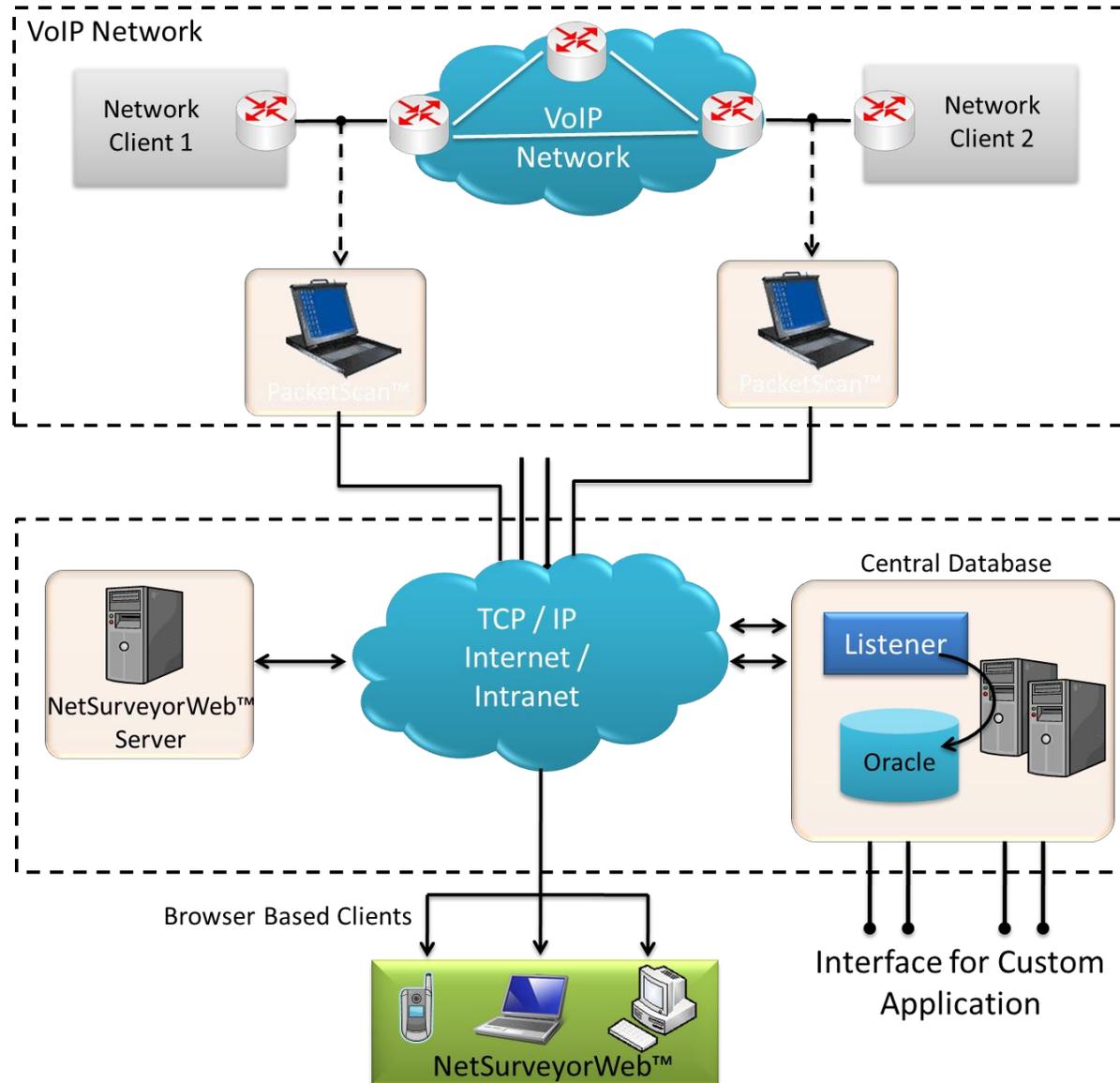
- VQT PESQ
- VQT POLQA
- VQuad Call Events
- Audio and Delay Analysis
- TCP
- UDP
- VOIP
- ROUTE
- HTTP
- FTP
- DNS
- SMS
- EMAIL
- Phone Info
- SIM
- UE
- EMU

The map displays a circular route around Washington D.C. and Arlington, Virginia, marked with red and green pins. A popup window is open over a location in North Bethesda, MD, USA, showing the following data:

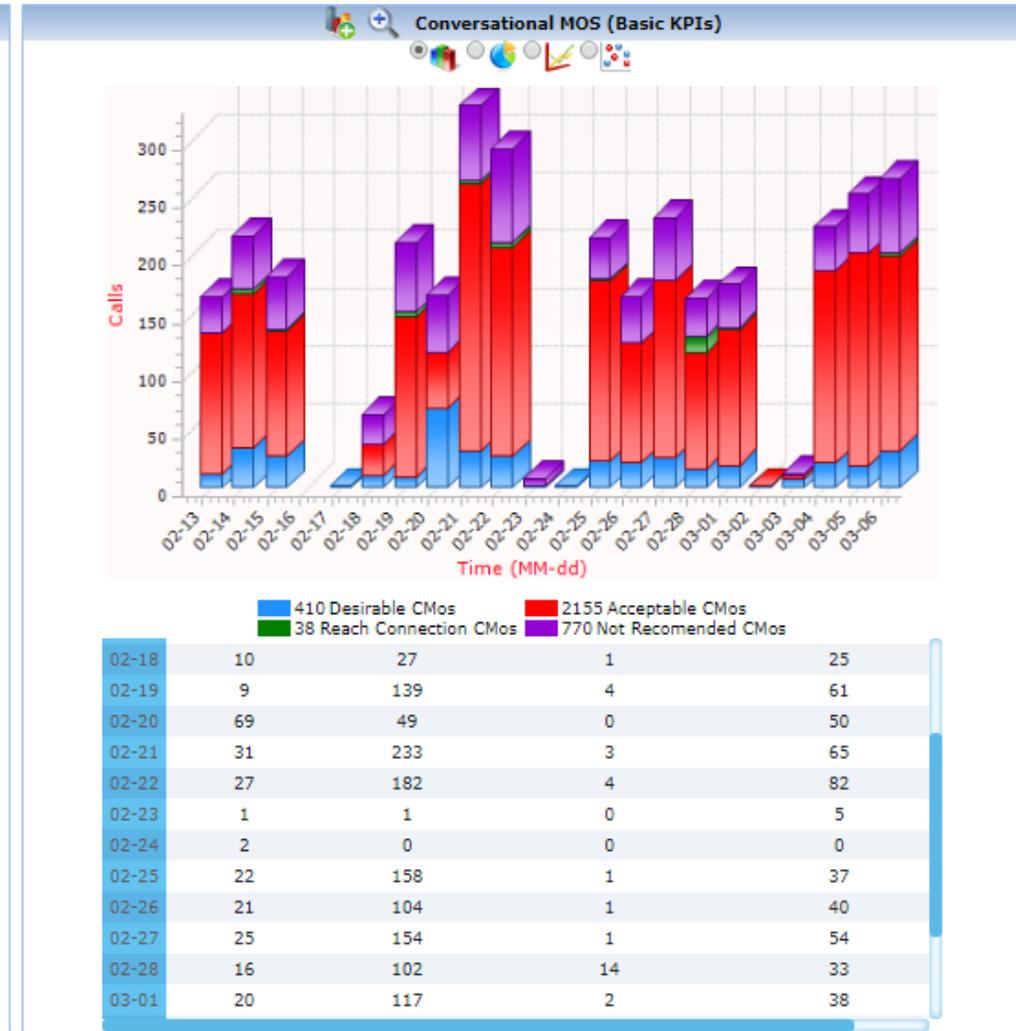
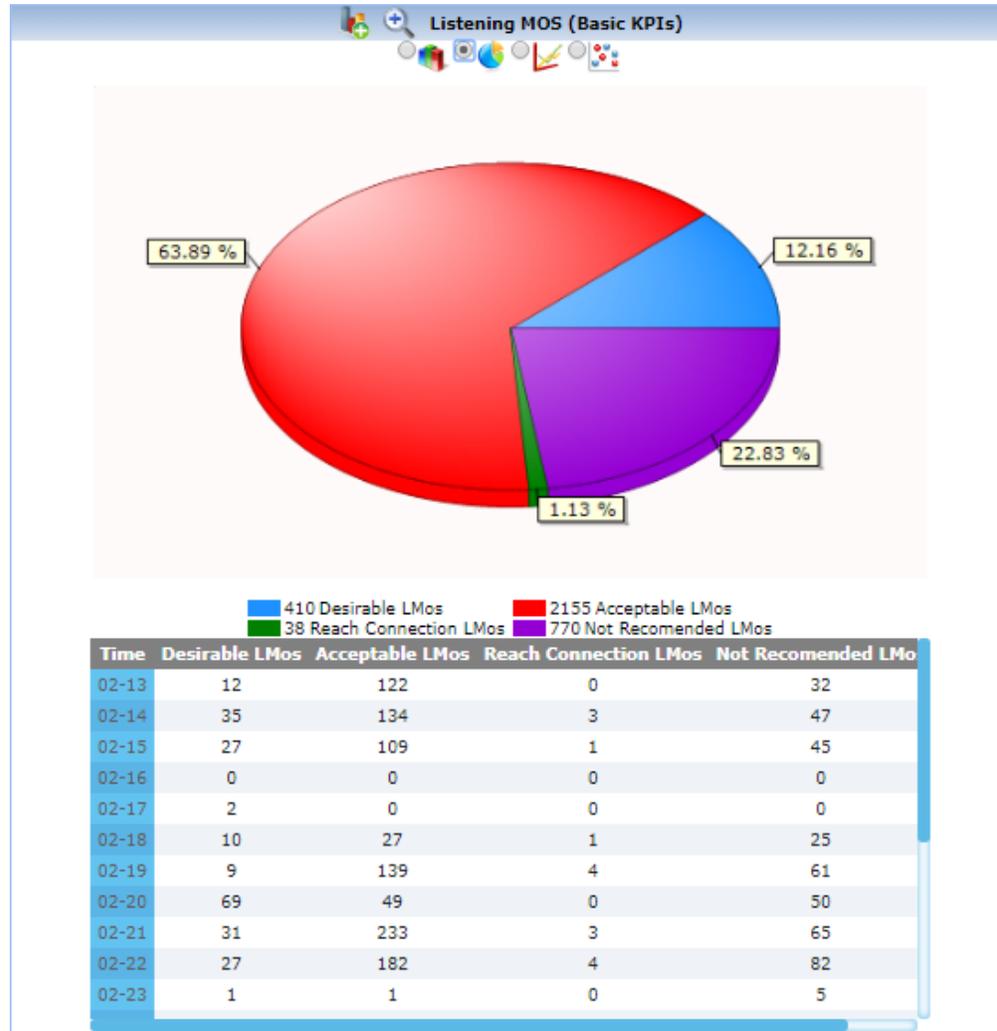
| RESULT | |
|-----------------|---------------------------------|
| VQuad Timestamp | 2022-05-25 11:51:54 |
| THRESHOLD | PASS |
| VQuad Device ID | vmobile2Galaxy |
| VQuad Call ID | vMobileBeltway |
| PARAMETERS | POLQA MOS: 3.32 |
| Latitude | 39.029 |
| Longitude | -77.141 |
| LOCATION | 2VH5+HJ North Bethesda, MD, USA |

Buttons: Results Display

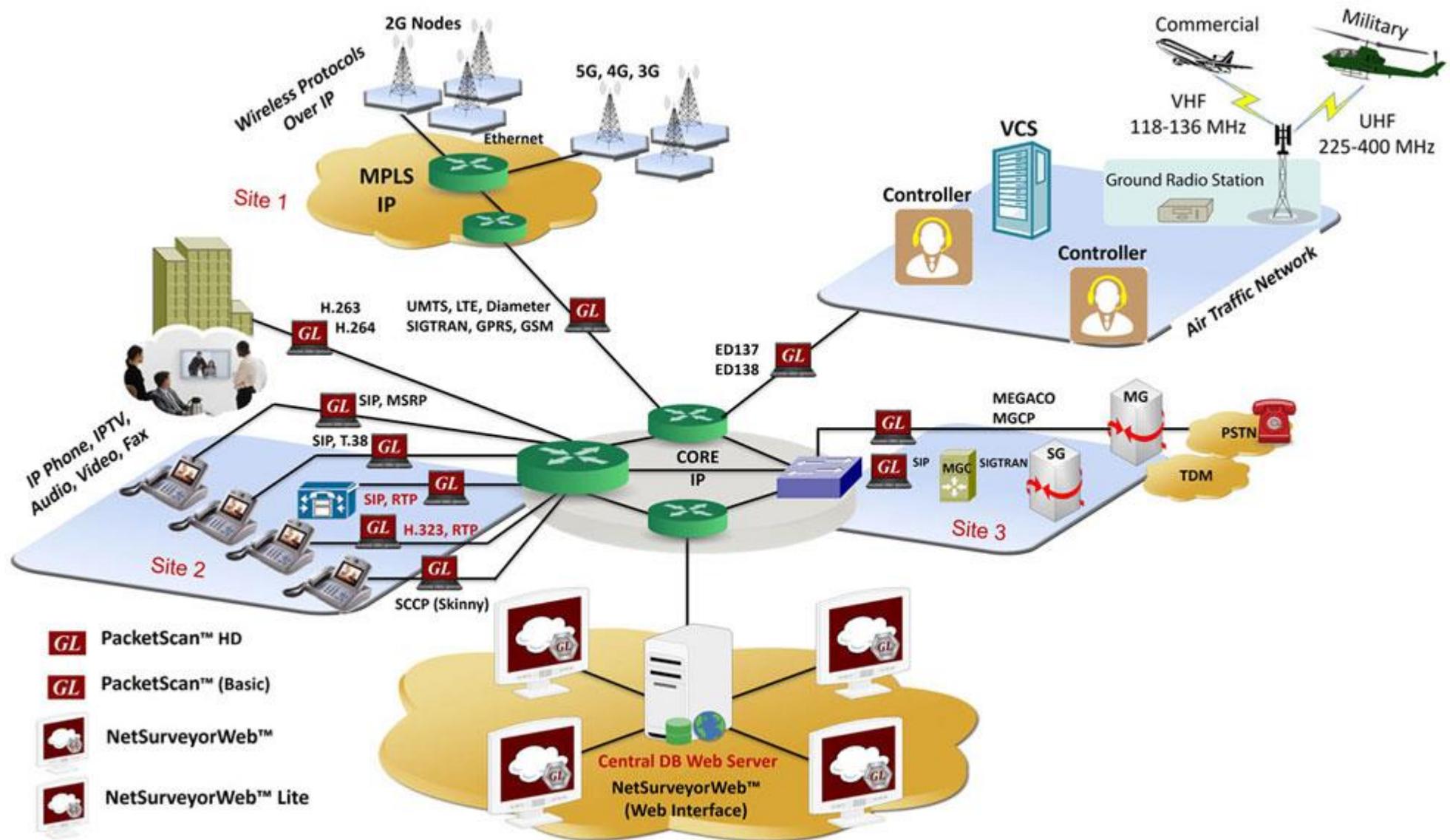
Passive / Non-Intrusive Packet Monitoring and Surveillance System (VoIP)



NetSurveyorWeb™ - Reports View

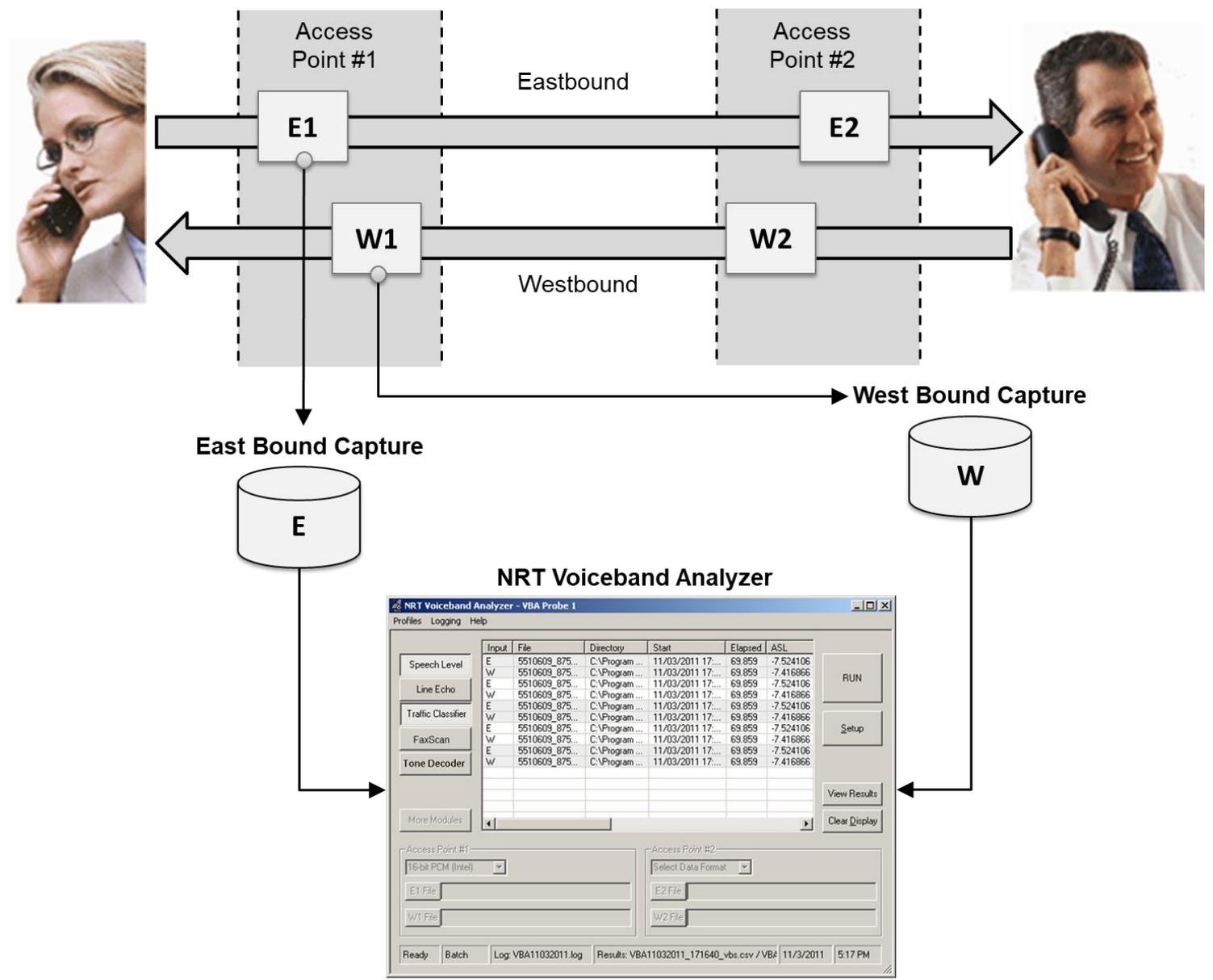


GL's PacketScan™

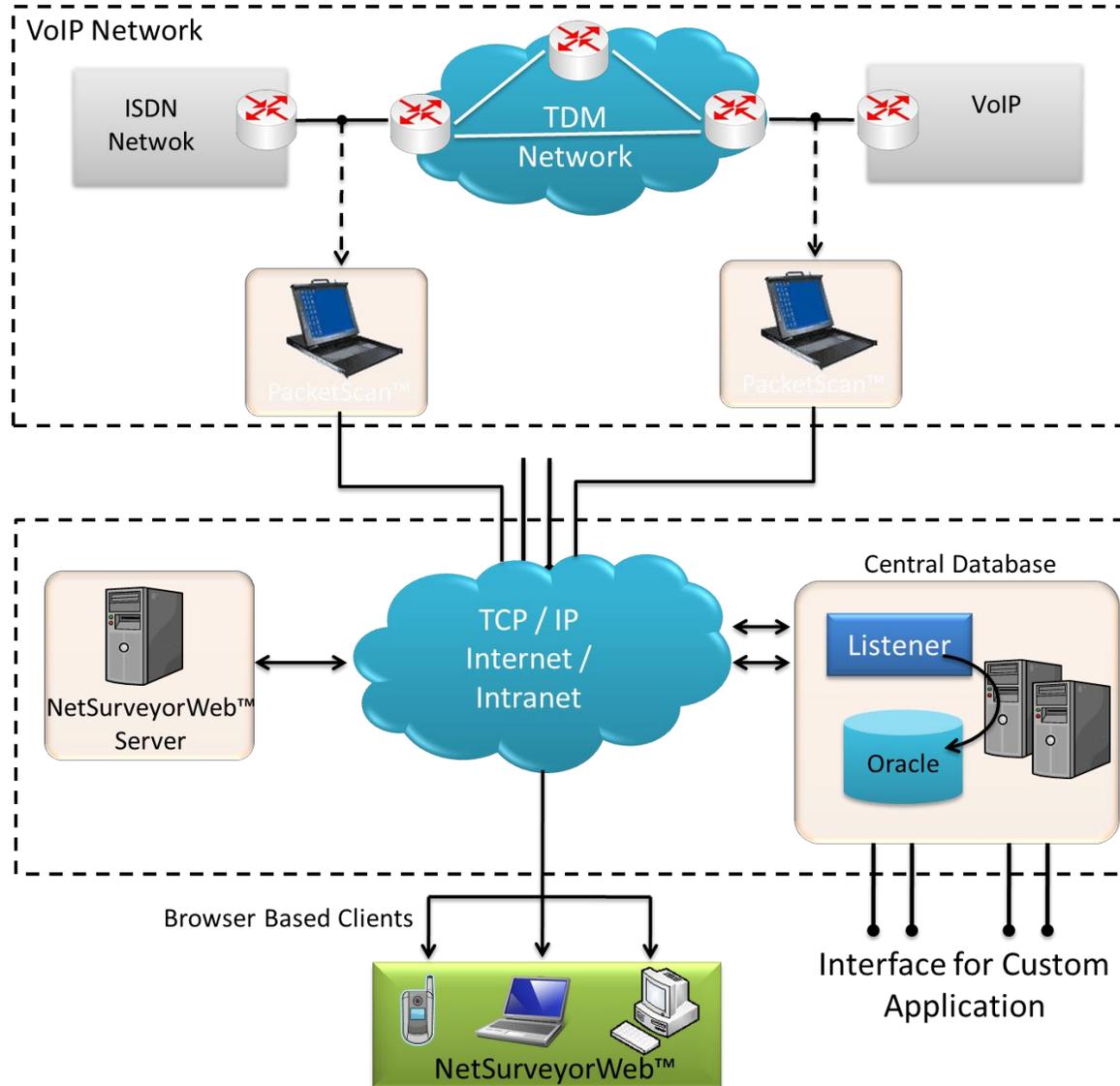


-  PacketScan™ HD
-  PacketScan™ (Basic)
-  NetSurveyorWeb™
-  NetSurveyorWeb™ Lite

Voice Band Analyzer (VBA)



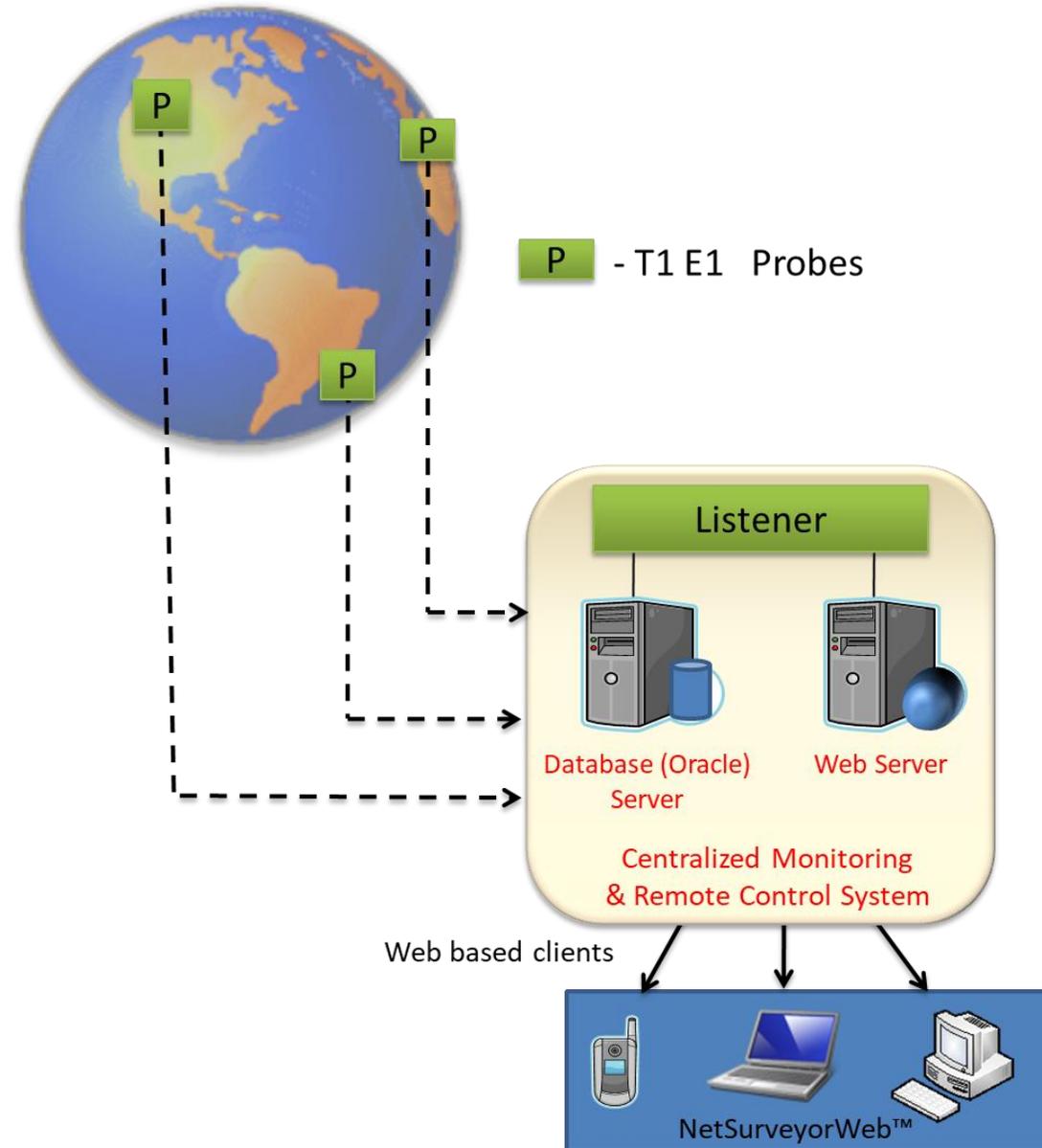
Passive Network Surveillance System (TDM, Wireless)



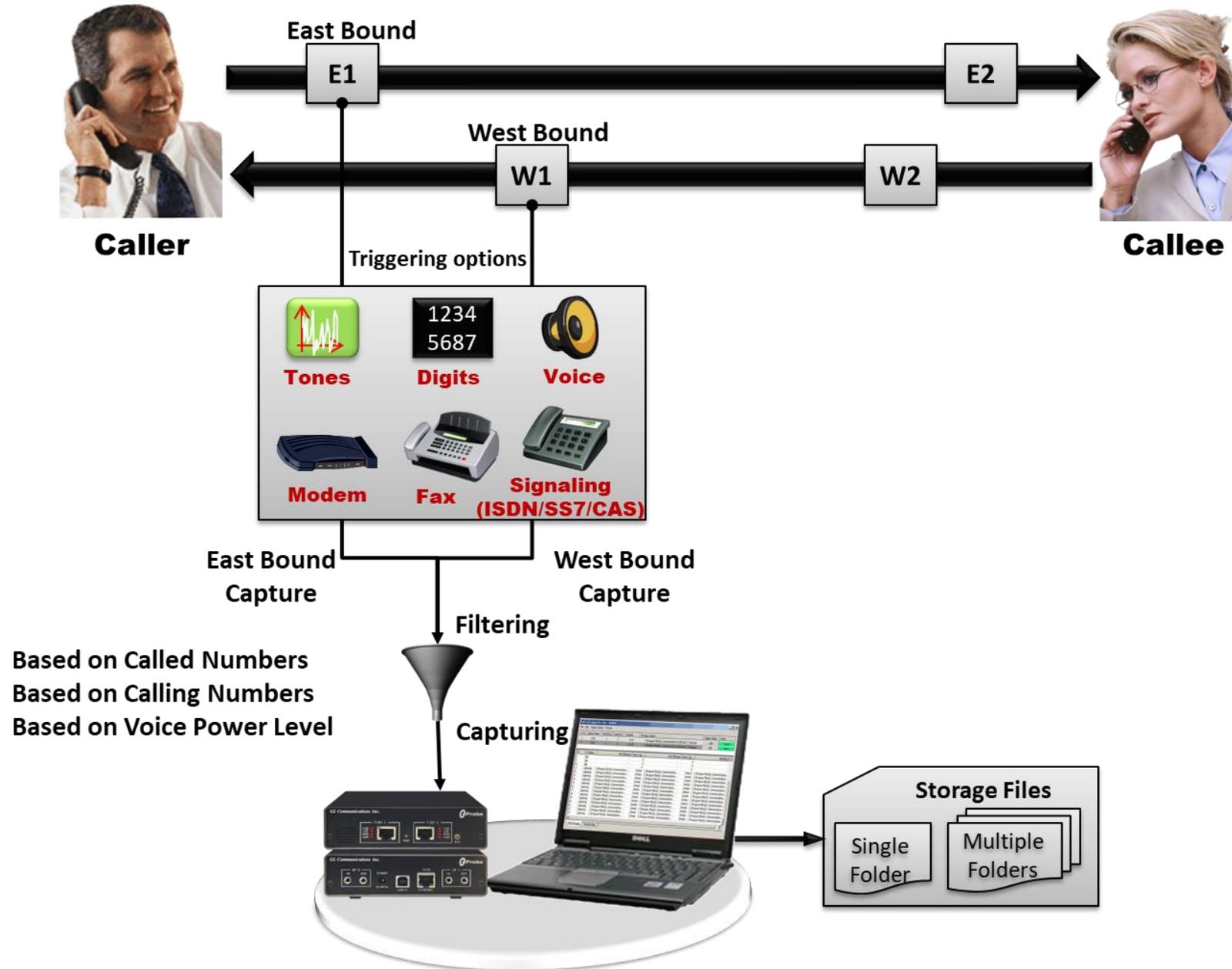
T1 E1 / IP

Passive TDM, Wireless Probes

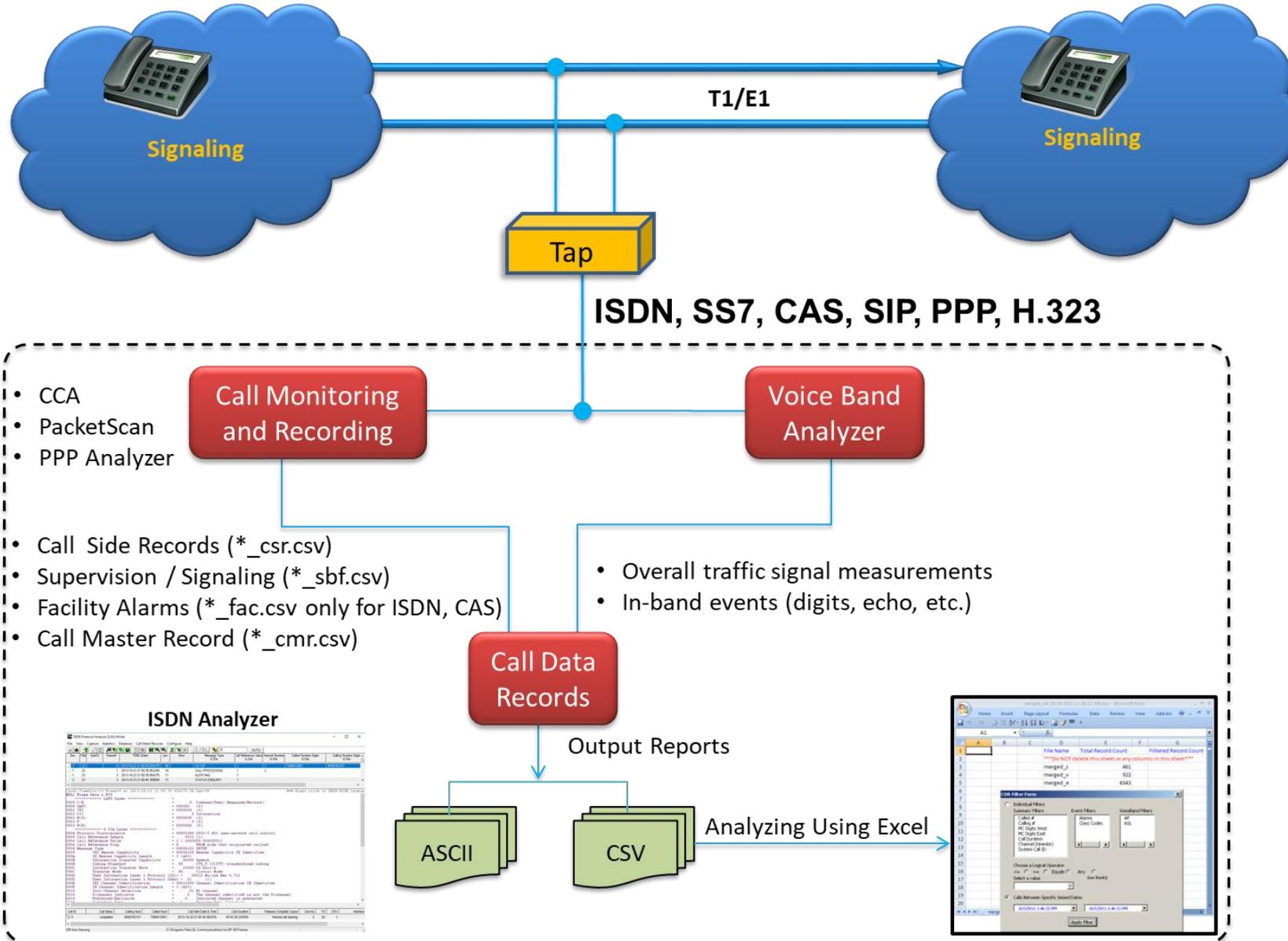
- Many Probes in multiple Locations
- Monitoring Many Types of Data (Alarms, Protocols, QOS Statistics)
- All Probes Connected to Centralized Storage Location (Database)



Call Capture Analysis (CCA)



Call Data Records (CDR)



Application Summary

| Part # | Description |
|--------|---|
| VQT004 | Voice Quality Testing (VQT) Software (PESQ LQ/LQO/WB) |
| VQT500 | MobNetMon™ |
| VQT010 | VQuad™ Software (Stand Alone) |
| PKV100 | PacketScan™ (Online and Offline) |
| PKS120 | Message Automation & Protocol Simulation (MAPS™) for SIP |
| PKS122 | Message Automation & Protocol Simulation (MAPS™) for MEGACO |
| PKS124 | Message Automation & Protocol Simulation (MAPS™) for MGCP |
| VBA032 | Near Real-time Voice-band Analyzer |
| VQT035 | FXO RJ11 Hardware Tap and Audio Capture Software |
| VQT241 | Dual Universal Telephony Adaptor (UTA) |

Thank you